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Treatment of hemiplegic shoulder pain in the Netherlands: results of a national survey

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Objective: To describe the methods of treatment applied by physiotherapists, occupational therapists, rehabilitation physicians, nursing-home physicians and neurologists for hemiplegic shoulder pain, and to investigate their beliefs about the effectiveness of triamcinolone acetonide injections for this diagnosis.

Design: Postal questionnaire with structured and open-ended questions. If necessary, a written reminder was sent after 2–3 weeks.

Subjects: One hundred physiotherapists, 100 occupational therapists, 100 rehabilitation physicians, 100 nursing-home physicians and 100 neurologists in the Netherlands. These healthcare workers were all active in the rehabilitation of stroke patients.

Results: The response was 351 (70.2%), ranging from 58% (neurologists) to 83% (physiotherapists). Fifty-four different (combinations of) treatments were mentioned and were classified into eight treatment groups. The frequency of the first choice of treatment was: physiotherapy (32%), prevention/instruction/education (22%), oral medication (8%), local injection (7%), sling (4%), referral (3%), other therapies (4%), and different combinations (20%).

In total, 86 respondents had applied local injections: 70 rehabilitation physicians, 10 nursing-home physicians and 6 neurologists. The injections used were: corticosteroids alone (51.2%), in combination with a local anaesthetic (37.2%) or a local anaesthetic only (9.3%). Belief in the effectiveness of triamcinolone injections, measured on a 0–100 point scale, was: physiotherapists median 62.5 (IQR 29.75–71.75), occupational therapists median 50.0 (IQR 43.0–63.0), rehabilitation physicians median 70.0 (IQR 56.5–80.0), nursing-home physicians median 35.0 (IQR 21.0–64.5), neurologists median 47.0 (IQR 20.0–63.0).

Conclusions: As preventive measures and physiotherapy, or a combination of both, were found to be the favourite methods of treatment for hemiplegic shoulder pain in this survey, it seems that most physicians and therapists rely on a mechanical approach to hemiplegic shoulder pain. Rehabilitation physicians used additional local (anti-inflammatory) injections.

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Introduction

Hemiplegic shoulder pain is a common problem after stroke. The occurrence of hemiplegic shoulder pain reported in the literature varies from 16 to 84%.¹⁻⁶ This problem is encountered in many different disciplines, and many different therapies are applied, but which treatment is best for hemiplegic shoulder pain remains unclear.

Correct positioning and careful handling of the hemiplegic limb are believed to prevent hemiplegic shoulder pain,⁷ but it is not known whether this is, indeed, the case. Furthermore, there are various opinions about the best way to keep the hemiplegic limb in a correct position.^{1,2,4,8,9} Some researchers recommend exercises which mobilize the shoulder to prevent hemiplegic shoulder pain, although this could be somewhat dangerous.^{10,11} Subluxation of the humerus often occurs after stroke. Although the relationship between subluxation and hemiplegic shoulder pain remains unclear, various techniques are used to correct this subluxation, including neuromuscular electric stimulation,¹² slings, orthoses and wheelchair adaptations.¹³⁻¹⁵

The signs and symptoms of hemiplegic shoulder pain are similar to those found in a non-hemiplegic painful stiff shoulder (capsulitis adhaesiva).¹⁶ Physiotherapy does not seem to be an effective treatment for this problem.¹⁷ Capsulitis adhaesiva can be successfully treated with corticosteroid injections in the shoulder¹⁸⁻²¹ or with a combination of corticosteroid and a local anaesthetic.²² Therefore, Dekker *et al.*²¹ advocate intra-articular injections with triamcinolone acetonide (a corticosteroid) for hemiplegic shoulder pain.

In practice, many different methods of treatment are applied, and many disciplines are involved in the treatment of patients with hemiplegic shoulder pain. The purpose of this survey was to determine which methods of treatment are applied to patients with hemiplegic shoulder pain by physiotherapists, occupational therapists, rehabilitation physicians, nursing-home physicians and neurologists in the Netherlands. Since this survey was part of the preparations for a randomized clinical trial of triamcinolone acetonide injections in hemiplegic shoulder pain, we also

included questions about the therapists' beliefs in the effectiveness of these injections.

Method

A postal questionnaire was sent to 100 physiotherapists, 100 occupational therapists, 100 rehabilitation physicians, 100 nursing-home physicians and 100 neurologists. The addresses were selected from the most recent issue of a general address book covering all Dutch healthcare facilities.²³ All rehabilitation centres were selected, with the exception of child rehabilitation centres, and nursing homes that only care for psychogeriatric patients were also excluded. The addresses of the other nursing homes, general hospitals and university hospitals were selected at random. Before the questionnaire was sent, the selected hospitals, rehabilitation centres and nursing homes were contacted by telephone to identify the therapist or physician who was responsible for the stroke patients. In the Netherlands, neurologists generally work in hospitals and nursing-home physicians work in nursing homes, so only the names of these professionals were requested there. Rehabilitation physicians, physiotherapists and occupational therapists were sampled from rehabilitation centres, general and university hospitals and nursing homes. When 100 names of suitable candidates within a professional group were obtained, no further calls were made. The questionnaire was addressed personally to the professionals thus identified. If they did not return the questionnaire within 2-3 weeks they received a reminder (a letter and another copy of the questionnaire).

The questionnaire was divided into three sections. In the first section the respondents were asked to estimate the number of patients with hemiplegic shoulder pain they had treated in the previous 12 months. The next question was: 'Please state the three methods of treatment you apply most frequently to patients with hemiplegic shoulder pain? Please describe these methods of treatment as comprehensively as possible.' The second section of the questionnaire concerned injection therapy: 'Do you ever treat patients with hemiplegic shoulder pain with injections? If so, what drug or combination of drugs do you

inject, what volume do you use, how many injections do you give, and at what intervals?' They were also asked which injection technique they used most frequently (anterior, posterior or another technique) and whether the drug was usually intra-articular, peri-articular, intra-articular and peri-articular (in the same injection) or elsewhere. The last section of the questionnaire consisted of a study protocol in which patients with hemiplegic shoulder pain were treated with three intra-articular injections of triamcinolone acetonide (40 mg in 1 ml) with an interval of 1 and 2 weeks, respectively. The respondents were asked: 'Do you expect this treatment to be effective?' They could rate their expectancy on a visual analogue scale (VAS) score (0 = no effect at all, 100 = very effective). The final question asked them to name the most important source on which this expectancy was based (practical experience, scientific literature, postgraduate education, or some other source).

As mentioned above, the three most frequently used methods were asked for in an open-ended question. The reason for this was to give the respondents the opportunity to mention every possible type of treatment without any restrictions. There were 34 different methods of treatment mentioned, and a further 20 different combinations of treatments. Based on the answers given by the respondents, the answers were summarized for the analyses into the fol-

lowing categories: (a) prevention/instruction/education, (b) physiotherapy, (c) sling/orthoses/bandages, (d) oral medication, (e) local injection, (f) referral, and (g) others. Only respondents who had treated at least one patient with hemiplegic shoulder pain in the previous year were included in the analysis. The Wilcoxon signed rank sum test was applied,²⁴ and the data were analysed in SPSS 6.0.

Results

The analysis was based on 351 respondents from a total of 500 (70.2%). The response varied from 83% of the physiotherapists to 58% of the neurologists. There were 91 nonrespondents. Another 58 questionnaires were returned, but excluded from the analysis for the following reasons: no patients with hemiplegic shoulder pain treated during the previous 12 months (39), questionnaire filled in at a different work address (4), retired (2), no longer working at the same address (1), reason unknown (12).

Table 1 presents the response rates and general characteristics of the respondents. It shows that most of the responding occupational therapists were female and that the majority of physicians were male.

Table 2 shows the frequency of the first choice of treatment (reported as the first of the three

Table 1 General characteristics of 351 respondents who treated at least one patient with hemiplegic shoulder pain during the previous 12 months

Profession	Response (n and %)	Sex (% F)	Mean age in years (range)	Median number of patients ^a (range)	Mean work experience in years (range)	Workplace
Physiotherapist	83	53	38.2 (24–55)	6.0 (1–50)	14.3 (1–29)	H 35; RC 31; NH 11; elsewhere 6
Occupational therapist	75	89	32.8 (20–51)	8.0 (1–52)	8.6 (0.5–28)	H 29; RC 19; NH 22; combinations 5
Rehabilitation physician	75	28	43.4 (30–60)	10 (1–75)	11.7 (0.5–30)	H 33; RC 10; combination 32
Nursing-home physician	60	27	41.7 (30–56)	6.0 (1–45)	12.3 (2.5–33)	NH 60
Neurologist	58	17	46.3 (35–62)	5.0 (1–50)	15.3 (2–32)	H 57 ^b

^aMedian number of patients with hemiplegic shoulder pain treated during the previous 12 months.

^bOne person did not answer this question.

H, hospital; RC, rehabilitation centre; NH, nursing home.

Table 2 First choice of treatment (reported as the first of the three most frequently used methods)

	Physiotherapist (n = 83)	Occupational therapist (n = 75)	Rehabilitation physician (n = 75)	Nursing home physician (n = 60)	Neurologist (n = 58)	Total (n = 351)
Prevention/instruction/education	23	29	14	8	2	76
Physiotherapy	39	20	18	13	23	113
Sling/orthoses/bandages	1	3	3	1	5	13
Oral medication ^a	2	0	1	13	11	27
Local injection	0	1	20	1	1	23
Referral	0	1	0	3	6	10
Combinations	17	13	17	15	9	71
Other therapies	0	5	2	6	1	14
Missing	1	3	0	0	0	4

^a26 times this was (a combination of) analgesics; one neurologist prescribed dexamethasone.

most frequently used methods). Prevention/instruction/education and physiotherapy were frequently applied by all groups. Except for the neurologists, the other groups frequently used a combination of treatments. In 60 out of 71 combinations prevention/instruction/education was part of the combination, and in 42 out of 71 combinations physiotherapy was involved. These two methods of treatment were combined 32 times. Twenty out of 75 rehabilitation physicians used local injections, 13 out of 60 nursing-home physicians and 10 out of 58 neurologists prescribed analgesics, and one neurologist prescribed dexamethasone per os. Slings were not often applied as a first choice of treatment.

Table 3 shows the frequency of commonly applied methods of treatment mentioned in the three most frequently used methods, irrespective of the position of the treatment in the three mentioned. Obviously, the physiotherapists often apply physiotherapy. Surprisingly, though, occupational therapy is mentioned only once in combination with physiotherapy. Comparing Table 3 with Table 2, it is clear that slings, oral medication and local injections are mentioned relatively more often as second or third choice of treatment. Combinations of different types of treatment are mentioned 123 times: 99 times prevention/instruction/education were reported in combination with another method, and physiotherapy was reported as part of a combination 72 times. The combination of these two methods of treatment was mentioned 45 times.

Table 4 shows the expected effectiveness of triamcinolone acetonide injections in the painful hemiplegic shoulder. The expected effectiveness was measured on a 0–100 point scale, so it was tested whether the median differed from 50. Because the data were not normally distributed, the Wilcoxon signed rank sum test was applied. Only rehabilitation physicians seemed to believe in the effectiveness of this treatment, with a median expected effectiveness of 70 ($p = 0.00006$). The median scores of the other disciplines were: physiotherapists 62.5 ($p = 0.53$), occupational therapists 50.0 ($p > 0.2$), nursing-home physicians 35 ($p = 0.16$), neurologists 47 ($p = 0.30$).

The respondents were also asked on what grounds they based their expectations. This is

also shown in Table 4. Practical experience was most frequently mentioned as the source of the expectations. Scientific literature and postgraduate education were not often mentioned as the only source of information, but often combined with practical experience or other sources.

In total, 86 respondents had applied local injections (70 rehabilitation physicians, 10 nursing-home physicians, 6 neurologists, physiotherapists and occupational therapists are not qualified to give injections). Fifty-six (65.1%) had given intra-articular injections, 11 (12.8%) peri-articular, 10 (11.6%) intra-articular and peri-articular in the same injection and 9 (10.5%) elsewhere. Fifty-six (65.1%) respondents who had given injections used the posterior technique, 18 (20.9%) the anterior technique and 9 (10.5%) other techniques. One respondent did not answer this question.

The first choice of drugs to inject was: corticosteroids (51.2%), corticosteroids combined with a local anaesthetic (37.2%), and a local anaesthetic only (9.3%). Two respondents did not answer this question. Botulinum and phenol were both mentioned once as a second choice of drugs to inject.

Discussion

The objective of this survey was to investigate the methods used in the treatment of hemiplegic shoulder pain in the Netherlands. The high response rates suggest that healthcare workers consider hemiplegic shoulder pain to be an important problem. The questionnaire was sent to healthcare workers in hospitals, rehabilitation

Clinical messages

- In the Netherlands many different (combinations of) treatments are applied for hemiplegic shoulder pain.
- Local corticosteroid injections are used often by rehabilitation physicians, less by others.
- Further research is needed to find the most effective strategy to treat hemiplegic shoulder pain.

Table 3 Commonly applied methods of treatment (three most frequently used methods: maximum of three answers per person)

	Physiotherapist (n = 83)	Occupational therapist (n = 75)	Rehabilitation physician (n = 75)	Nursing home physician (n = 60)	Neurologist (n = 58)	Total (n = 351)
Prevention/instruction/education	42	48	21	13	4	128
Physiotherapy	137 ^a	66	48	33	45	329
Sling/orthoses/bandages	11	17	19	8	10	65
Oral medication ^b	2	0	13	54	38	107
Local injection	1	3	70	8	2	84
Referral	1	2	0	8	22	33
Combinations	22	35	29	22	15	123
Other therapies	1	10	5	12	5	33
Total	217	181	205	158	141	902

^aThis exceeds the total number of physiotherapists because some physiotherapists listed more than one type of physiotherapy e.g. 1) passive mobilization, 2) active mobilization, 3) ultrasound. In such cases physiotherapy is counted three times.

^b104 times this was (a combination of) analgesics, twice spasmolytic agents, and once dexamethasone.

Table 4 Expected effectiveness of three injections of triamcinolone acetonide (1 ml Kenacort-A 40) and source of these expectations

	Physiotherapist ^a (n = 32)	Occupational therapist ^a (n = 21)	Rehabilitation physician ^a (n = 69)	Nursing home physician ^a (n = 41)	Neurologist (n = 35)
Expected effectiveness					
Median in mm ^b (IQR)	62.5 (29.75–71.75)	50.0 (43.0–63.0)	70.0 [#] (56.5–80.0)	35.0 (21.0–64.5)	47.0 (20.0–63.0)
Source of expectations					
Practical experience	20	12	48	17	20
Scientific literature	3	0	6	3	1
Education	3	0	4	5	2
Combinations	5	7	11	16	11
Missing	1	2	0	0	1

IQR, interquartile range.

^aNumber who answered this question.

^b0 = no effect at all, 100 = very effective.

[#]Significant difference from 50; Wilcoxon signed rank sum test $p = 0.00006$.

centres and nursing homes, because it was expected that these professionals frequently encounter this problem. In less than 10% of the cases (Table 3) the patients were referred to other specialists ((orthopaedic) surgeons or anaesthesiologists). Because these referrals were rare, it was concluded that the survey provides a good overview of the methods of treatment applied to patients with hemiplegic shoulder pain. Perhaps an exception should be made for nurses, who probably also encounter patients with hemiplegic shoulder pain quite frequently. It is not known whether they treat these patients, and if so, with what methods, but it seems reasonable to assume that they play an important role in the prevention of hemiplegic shoulder pain in the acute phase of stroke patients.

Although no further definition of hemiplegic shoulder pain was given, very few respondents seemed to have had problems with the description. Not only the definition, but also the cause of hemiplegic shoulder pain is unclear, and many possible pathophysiological mechanisms are described; based on these concepts, many different methods of treatment are recommended.⁷ In view of these uncertainties, it is not surprising that in this survey the application of many different (combinations of) treatments is reported. In spite of all these differences, the basis of most methods of treatment is mechanical. The conclusion is therefore drawn that there is consensus

about the mechanical approach to hemiplegic shoulder pain. However, many rehabilitation physicians give additional intra-articular corticosteroid injections. This suggests that they also consider capsulitis to be an important factor in hemiplegic shoulder pain, and the cause of the capsulitis could be frequent injuries of the paretic shoulder.²⁵

Rehabilitation physicians do not only frequently inject corticosteroids in the shoulder joint, but they seem also to be the group of professionals that believes in the effectiveness of triamcinolone acetonide injections. The other groups are uncertain about this method of treatment. However, the considerable number of missing values makes it difficult to interpret these findings. All groups based their beliefs mainly on practical experience, although there is some evidence that local anti-inflammatory injections may be effective in the treatment of hemiplegic shoulder pain.²¹

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